
ISDN Signalling Link

ISDN Signaling Link (ISL) provides the capability to replace both digital and analog conventional trunk signaling with out-of-band ISDN D-channel signaling. The following applications are supported by ISL:

- Calling Line Identification (CLID)
- CLID in Call Detail Recording (CDR)
- Electronic Switched Network (ESN) interworking
- Network Call Redirection (NCRD)
- Network Ring Again (NRAG)
- Network Message Services (NMS)
- Network Call Party Name Display (NCPND)
- Network ACD (NACD)

When the D-channel is inactive, ISL trunk calls can automatically revert to conventional trunk signaling. This applies to both primary and backup D-channels.

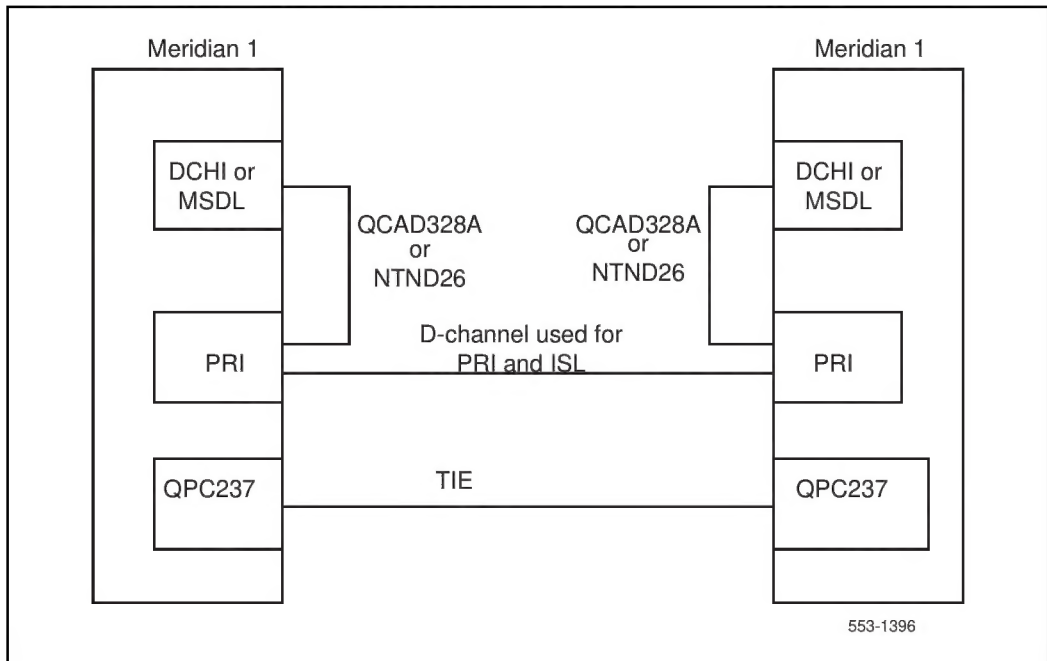
ISL supports TIE and ISA trunk types with Meridian 1 to Meridian 1 connectivity.

The TIE lines and trunk used for the D-channel can be leased from the central office (CO). With leased lines, the function of the CO is simply to provide the trunk wire facilities between Meridian 1 systems for circuit switched connections.

The ISDN Signaling Link supports a uniform trunk hardware configuration. This configuration uses the QPC237 4-wire E&M TIE trunk card in place of other analog trunk cards (such as the QPC71 TIE trunk card or the QPC72 DID/DOD trunk card).

Note: If the QPC237 TIE trunk card is not used, backup D-channel is not available.

Figure 36
ISDN Signaling Link: shared mode



There are two modes of ISL operation:

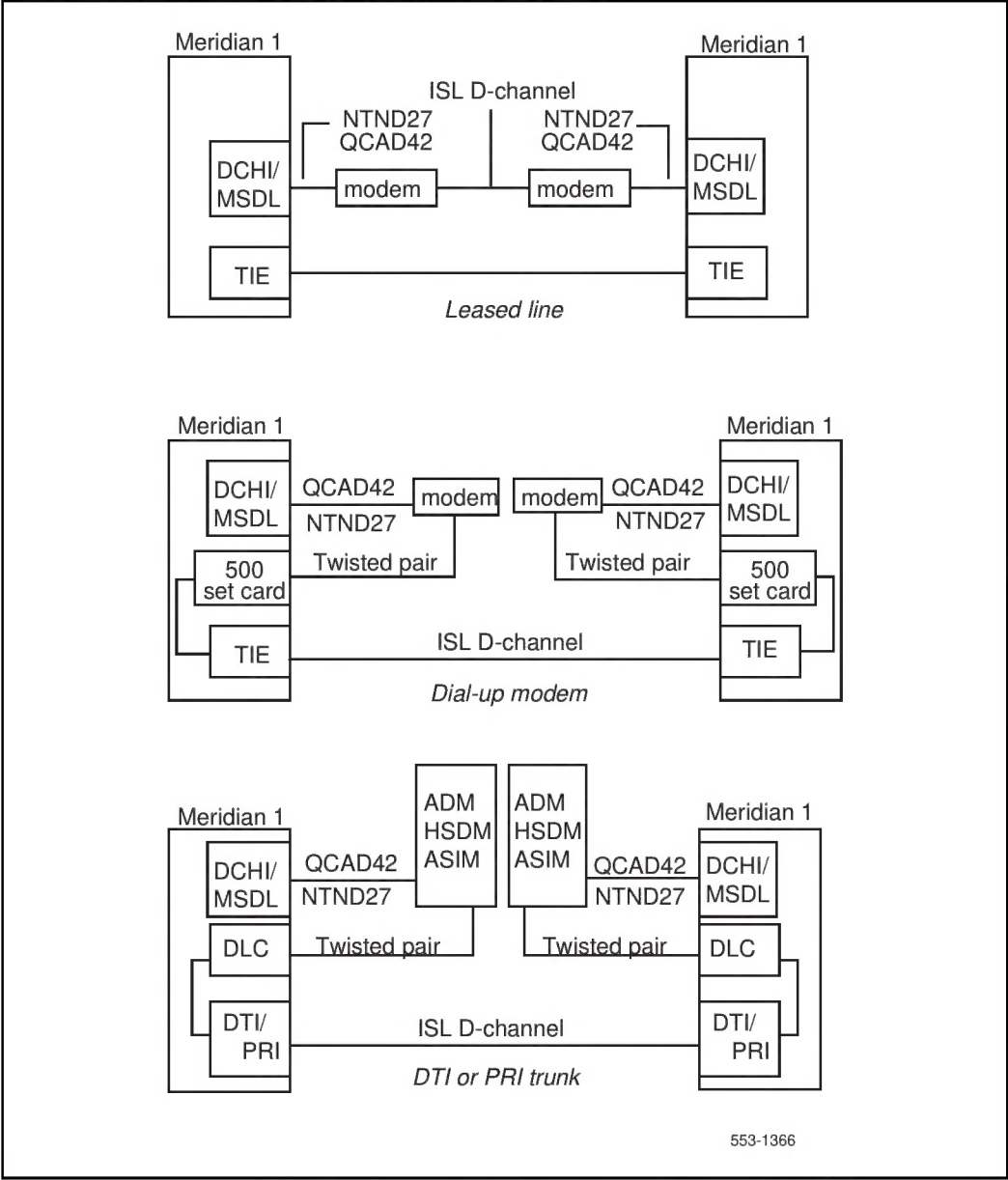
- Shared mode: The DCHI supports ISDN PRI signaling and ISL trunks. The configuration is basically the same as the PRI D-channel, with the D-channel also supporting ISL trunks. See Figure 36.
- Dedicated mode: The DCHI does not support ISDN PRI signaling. The DCHI is reserved for ISL use. The D-channel can communicate with the far end by means of a dedicated leased line, dial-up modem, or DTI/PRI trunk. See Figure 37.

For ISL to use an ISA route, the ISA route must be identified as ISL in LD 16. This is done by assigning the MODE prompt to ISLD.

When an ISL call utilizes a Call-by-Call Service, the D-channel associated with the ISA route for the Call-by-Call Service is used for signaling.

Note: In X11 release 15, the High Speed Data Module (HSDM) is used in place of both the Asynchronous/Synchronous Interface Module (ASIM) and the Add-On Data Module (ADM).

Figure 37
ISDN Signaling Link: dedicated mode configurations



Reverting to conventional trunk signaling This feature handles ISL trunk calls by reverting to conventional trunk signaling when the D-channel is inoperative. This applies to the primary and backup D-channels as well as ISA.

When a primary or backup D-channel goes down:

- Established ISL calls remain established, regardless of the signaling method used.
- Transient ISL calls that are set up using conventional trunk signaling are not disturbed.
- Transient ISL calls that are set up by means of D-channel signaling are dropped. The user must reinitiate the call. Then conventional trunk signaling is used if the D-channel remains inactive.
- ISL channels are not marked maintenance busy.

There are two scenarios that can occur when a D-channel is reestablished, one with backup D-channel and one without. When a backup D-channel reestablishes:

- There is no impact. The other D-channel simply recovers. ISL calls still using D-channel signaling (in existing software) can bypass the restart procedure.

When a D-channel that does not have a backup reestablishes:

- Transient and established ISL calls that are set up using conventional trunk signaling are not disturbed.
- Established ISL calls that are set up using D-channels are disconnected.
- To disconnect an established ISL call, the system uses the same signaling method that the call was set up with.

When the ISL D-channel goes down, the following scenario occurs. Since ISL trunks can convert to conventional trunk signaling, the ISL route (which is associated with a D-channel) is bypassed using conventional trunk signaling.

Feature implementation

There are two modes of ISDN Signaling Link (ISL) operation:

- Shared mode
The DCHI supports ISDN PRI signaling and ISL trunks. The configuration is basically the same as the PRI D-channel, with the D-channel also supporting ISL trunks.
- Dedicated mode
The DCHI does not support ISDN PRI signaling. The DCHI is reserved for ISL use. The D-channel communicates with the far end by means of a dedicated leased line, dial-up modem, or DTI/PRI trunk.

ISDN Signaling Link (ISL) supports Calling Line Identification (CLID) and CLID in Call Detail Recording (CDR), Electronic Switched Network (ESN) interworking, and Network Ring Again (NRAG) applications. The ISL service is supported in the uniform trunk hardware configuration. For Call-By-Call Service, an ISA route must be established and identified with the ISL interface.

Configuring ISL

Note: Before making a change to an ISL trunk, disable the D-channel. The Meridian 1 may initialize if you do not follow this procedure.

To configure ISL, perform the following steps:

- 1 LD 17 Configuration Record (see Procedure 20)
Configure the D-channel for ISL use.
X11 release 17 and earlier
- OR*
- 2 LD 17 Configuration Record (see Procedure 21)
Configure the D-channel for ISL use.
X11 release 18 and later
- 3 LD 15 Customer Data Block (see Procedure 22)
Define a PRI customer.

- 4 LD 16 Route Data Block (see Procedure 23)
Enable the ISL option on a per route basis, assign a D-channel for each route, and enable the ISL Call-By-Call Service.
- 5 LD 14 Trunk Data Block (see Procedure 24)
Assign a channel identification to each trunk with the ISL option.

Procedure 20**Configure the D-channel for ISL in LD 17 (X11 release 17 and earlier) (Part 1 of 2)**

Prompt	Response	Description
REQ	CHG	Change data.
TYPE	CFN	Configuration record
...		
PARM	YES	Change parameters.
ISDN	YES	ISDN.
DCHI	1–15	DCHI port number (remove with Xnn)—only odd numbers allowed
BCHI	1–15	Back-up DCHI port number
USR		Change DCHI parameters
	PRA	D-channel for ISDN PRI only
	ISLD	D-channel for ISL in “dedicated” mode
	SHA	D-channel for ISL in “shared” mode, used for both ISDN PRI
Note 1: One of the above responses is mandatory and there is no default. Note 2: Package 147, ISDN Signaling Link, is required.		
DCHL	0–159	PRI loop for DCHI, not prompted with D-channel in dedicated mode (D-channel does not require a channel on the PRI)
BCHL	0–159	PRI loop number for BCHI

Procedure 20**Configure the D-channel for ISL in LD 17 (X11 release 17 and earlier) (Part 2 of 2)**

Prompt	Response	Description
OTBF	1–(16)–127	Number of output request buffers—use default (16)
DRAT		D-channel transmission rate
	56K	56 kbps, default when LCMT (LD 17) is AMI
	64KC	64 kbps clear, default when LCMT (LD 17) is B8S
	64KI	64 kbps inverted HDLC (64 Kbps restricted)
		In X11 release 15 and later, DRAT is not prompted when configuring ISL D-channels because the speed is controlled by the modem baud rate.
PRI	loop ID	Not prompted if the D-channel is in dedicated mode (the D-channel does not require a channel on the PRI card)
ISLM	1–382	Number of ISL trunks controlled by the D-channel (no default value)
CLOCK	(EXT), INT	D-channel clock type
		EXT = Source of primary clock is external to DCHI card. Normally, EXT is used with PRI/ISL.
		INT = Source of primary clock is internal to DCHI card. INT is used only during DCHI loopback testing, where one side is set to INT, the other side is set to EXT.

Procedure 21**Configure the D-channel for ISL in LD 17 (X11 release 18 and later) (Part 1 of 2)**

Prompt	Response	Description
REQ	CHG	Change
TYPE	CFN	Configuration Record
ADAN	NEW DCH 0–63	Add a primary D-channel (can also be CHG and OUT DCH)
CTYP	DCHI, MSDL	Card type
DNUM	0–15	Device number: physical port (odd) for D-channel on DCH, physical card address for MSDL
_PORT	0–3	Port number on MSDL card
USR	PRI, ISLD, SHA	D-channel mode
_ISLM	1–382	Number of ISL trunks controlled by the D-channel
DCHL	0, 2, 4, ...159	PRI loop number for DCHI
OTBF	1–(32)–127	Number of output request buffers
_BPS	xxxx	Baud rate for ISL D-channel on MSDL port (default 64000)
_PARM	R232,(R422) DCE, (DTE)	ISL D-channel interface and transmission mode (MSDL port only)
PRI	0–159 2–15	Additional PRI loops using the same D-channel, and interface ID
DRAT	(56K), 64KC, 64KI	D-channel transmission
IFC	aaa	Interface type: (D100), D250, ESS4, ESS5, SL1, S100
SIDE	NET, (USR)	Meridian 1 node type
RLS	xx	Release ID of the switch at the far end of the D-channel
RCAP	aaa	Remote D-channel capabilities: MSL, NCT, ND1, ND2, RVQ
_CLOK	INT, (EXT)	Internal or external clock on ISL D-channels

Procedure 21

Configure the D-channel for ISL in LD 17 (X11 release 18 and later) (Part 2 of 2)

Prompt	Response	Description
LAPD	Yes, (No)	D-channel LAPD parameters
__T23	1–(20)–31	Interface guard timer (DCHI only)
__T200	2–(3)–40	Retransmission timer
__N200	1–(3)–8	Maximum number of retransmissions
__N201	4–(260)	Maximum number of octets in information field
__T203	2–(10)–40	Maximum time (in seconds) without frames being exchanged
__K	1–(7)	Maximum number of outstanding frames
ADAN	NEW BDCH 0–63	Add a backup D-channel
PDCH	0–63	Primary D-channel
CTYP	DCHI, MSDL	Card type
DNUM	0–15	Physical port (odd) for D-channel, card number for MSDL
_PORT	0–3	Port number on MSDL card
BCHL	0, 2, 4, ... 159	PRI loop number for backup D-channel
RCVP	Yes, (No)	Auto-recovery to primary D-channel option
ADAN	<cr>, ****	Go on to next prompt or exit overlay

Procedure 22**Use LD 15 to define a PRI customer (Part 1 of 2)**

Prompt	Response	Description
REQ	NEW, CHG	Add or change a customer
TYPE	CDB NET_DATA	Customer data block. Networking Data (Release 21 gate opener).
CUST	0-99	Customer number
LDN0	xxxx . . x	Listed Directory Number 0 length This value must be set to terminate all incoming ISDN/DID calls. Determines the number of digits to translate.
ANAT	xxxx . . x	Attendant billing number ANAT and ANLD combined must be 7 digits.
ANLD	xxxx . . x	ANI listed DN ANLD and ANAT combined must be 7 digits.
AC2		Access code 2. Enter call types (type of number) that use access code 2. This relates to ESN dialing plans. If you do not have a dialing plan, <cr> past this prompt. Multiple responses are permitted. If a call type is not entered here, it automatically defaults to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber
	INTL	International
	SPN	Special number
	LOC	Location code (prompted only for NARS)
ISDN	YES	Change ISDN options
_PNI	1–32700	Private Network Identifier (for CLID)
_PFX1	xxxx	Prefix (area) code for International PRA (for CLID)
_PFX2	xxxx	Central office prefix for IPRA (for CLID)
_HNPA	100–999	Home Number Plan Area code (for CLID)

Procedure 22

Use LD 15 to define a PRI customer (Part 2 of 2)

Prompt	Response	Description
_HNXX	100–999	Prefix for central office (for CLID)
_HLOC	100–9999	Home Location Code (ESN) (for CLID)
_LSC	xxxx	Local steering code (for CLID)
_CNTP	LDN, (PDN)	Default for Calling Line ID (CLID)
_RCNT	0–(5)	Maximum internode hops in a network redirection call

Procedure 23

Use LD 16 to enable the ISL option on a per route basis (Part 1 of 3)

Prompt	Response	Description
REQ	NEW	Add a PRI trunk route
TYPE	RDB	Type of data
CUST	0–99	Customer number
ROUT	0–511	Route number
TKTP	TIE	Trunk route type
ESN	Yes, (No)	ESN signaling
BRIP	Yes, (No)	ISDN BRI packet handler route
ISDN	Yes, (No)	ISDN PRI option
_MODE	ISLD	Mode of D-channel that controls the route
_DCH	1–15	DCH port number or MSDL logical port number (prompted if Mode = ISLD)
_PNI	0–32700	Customer Private ID (unique to a customer)
_IFC	SL1	Interface machine type for this PRI route
_NCNA	(Yes), No	Network call name allowed

Procedure 23**Use LD 16 to enable the ISL option on a per route basis (Part 2 of 3)**

Prompt	Response	Description
_NCRD	(No), Yes	Network Call Redirection
_TRO	Yes, (No)	Trunk optimization allowed (denied) on the route
_NSF	Yes, (No)	Network Service Facility
_TIER	0–511	Incoming tie route number
_CHTY	ABCH, (BCH)	Signaling type for B-channel digital routes
_CTYP	aaa	Call type for outgoing direct dialed tie route
_INAC	Yes, (No)	Insert ESN access code to incoming private network call
_NCOS	(0)–99	Network Class Of Service
_CLS	aaa	Class of service restriction for tie route
_TGAR	0–31	Trunk group access restrictions
_IEC	000–999	Interexchange carrier ID
PTYP	aaa	Port type at far end
ICOG	IAO, ICT, OGT	Incoming and/or outgoing trunk
SIGO	aaa	Signaling arrangement
NEDC	ORG, ETH	Near end disconnect control
FEDC	ETH, FEC, JNT, (ORG)	Far end disconnect control
CPDC	Yes, (No)	Meridian 1 is the only controlling party on incoming calls
DLTN	Yes, (No)	Provide dial tone to the far end
PSEL	TLNK, (DMDM)	T-link or DM-DM protocol selection
EQAR	Yes, (No)	Enable Equal Access on this route

Procedure 23

Use LD 16 to enable the ISL option on a per route basis (Part 3 of 3)

Prompt	Response	Description
_GCR	(Yes), No	Use General Carrier Restriction for Equal Access calls
_NTOL	ALLOW, (DENY)	Allow or deny North American toll calls (1+ calls)
_ITOL	ALLOW, (DENY)	Allow or deny international toll calls (011+ calls)
_SCR	Yes, (No)	Use Selective Carrier Restriction for Equal Access calls
AUTH	Yes, (No)	Authcode to be prompted for incoming tie callers

Procedure 24

Respond to the following prompts in LD 14

Prompt	Response	Description
REQ	NEW, CHG, MOV, OUT, END	
TYPE	TIE	Trunk type allowed
TN	loop ch	Use loop number created in LD 17
RTMB	0–511 1–254	The route defined as an ISA route in LD 16
CHID	1–382	Channel identifier for ISL channels (remove with Xnn)—must be coordinated with far end (no default value)

Feature testing

To verify the ISL, do the following:

- 1** Coordinate with far end personnel. Place a call over a Meridian 1 switch.
- 2** As you are dialing, the dialed DN appears on your telephone.
- 3** When the far end telephone is ringing, the CLID of your telephone is displayed on the far end telephone.
- 4** Both telephones continue to display the CLID when the far end goes off hook.